August 25, 2008

**NOTICE OF DECISION**

Water Pollution Control Permit
Number NEV0089035

Newmont Mining Corporation

Twin Creeks Mine – South Project

The Nevada Division of Environmental Protection (Division) has decided to issue Water Pollution Control Permit NEV0089035, to Newmont Mining Corporation for the Twin Creeks Mine – South Project. This permit authorizes the construction, operation, and closure of approved beneficiation facilities in Humboldt County. The Division has been provided with sufficient information, in accordance with Nevada Administrative Code (NAC) 445A.350 through NAC 445A.447, to assure that the groundwater quality will not be degraded by this operation, and that public safety and health will be protected.

The permit will become effective September 9, 2008. The final determination of the Administrator may be appealed to the State Environmental Commission pursuant to Nevada Revised Statute (NRS) 445A.605 and NAC 445A.407. All requests for appeals must be filed by 5:00 PM, September 4, 2008, on Form 3, with the State Environmental Commission, 901 S. Stewart Street, Room 4001, Carson City, Nevada 89701-5249. For more information, contact Paul Eckert at (775) 687-9401, toll free in Nevada at (800) 992-0900, extension 4670, or visit the Division website at: http://ndep.nv.gov/bmrr/bmrr01.htm.

One comment letter was received during the public comment period. The comment letter, dated April 18, 2008, was received from John Hadder, Staff Chemist for Great Basin Resource Watch. Division responses to the comments, and the revised Permit and Fact Sheet, are attached to this notice of decision.

NDEP Response to Great Basin Resource Watch (GBRW) Comment Letter dated April 18, 2008 from John Hadder to Paul Eckart [sic] NDEP-BMRR (with additional input from Tom Myers included).

Comment 1: "We were surprised to find no pit lake water quality data as part of the routine monitoring and analysis for this permit. As part of this renewal process pit lake water quality should added in the quarterly reporting along with analysis of the translocated waste rock destined as pit back-fill."

*Response: The 'proto pit lake' formed in 2004 when mining occurred below the water table. Continued dewatering of the Mega Pit brought the water table down and in late 2007, after the Pit Water Quality Update was completed, the 'proto pit lake' disappeared. The present mine plan does not call for any reduction in dewatering, thereby preventing formation of the lake. However, the Permittee has agreed to a modification of the permit monitoring program to include quarterly pit lake water sampling any time water is present during the reporting cycle.*

*Characterization of the translocated waste rock used for pit backfill is required by the present permit.*

Comment 2: "…an active program to avoid the pit water from becoming degraded is highly recommended."

*Response: See response to Comment 1 above. If the pit lake does return, the Division reserves the right to revisit this issue and modify the permit requirements if necessary based on results of pit lake sample analyses.*

Comment 3: "Many of the "vadose zone monitor wells" around the Piñon Tailings Impoundment facility show elevated levels of chloride, sulfate, nitrate, total dissolved solids (TDS), and significantly WAD cyanide…The variation pattern of the WAD cyanide date for these wells appears to have had a seasonal connection implying that seepage was persistent, pulsed by influxes of spring precipitation with spikes in the second quarter of each year."

*Response: The Piñon Tailings Disposal Facility (PTDF)was removed from active service in 2001, and since that time no additional material has been placed in the impoundment. In 2006, the PTDF was capped and, as a result, the seasonal spikes in vadose well samples, observed in earlier years, were not evident in 2006 or 2007 (2Q data for 2008 were not yet available at the time of this writing). Since the second quarter of 2006 (inclusive), only 4 of the vadose wells (VW-1, -5, -6, -13) have had enough fluid to draw a usable sample, and those only intermittently. The data clearly show that this problem has been adequately addressed by the capping of the PTDF. The Division will continue to monitor these results and respond appropriately if future exceedances occur.*

*Water from wells MW-29-6 and MW-2R-1 (the only groundwater monitoring wells which have shown any exceedance over the last 5 years) has been pumped into the seepage pond since 1999. This pumping will continue until the data from the vadose wells indicate that the percolation of fluids carrying monitored constituents has abated. As an additional measure, Permittee has agreed to initiate a continuous pumping and monitoring program for MW-3 as well (added to the renewal permit as SOC item 2).*

Comment 4: "According to the MCI [sic] report from 2000, "…it was concluded that seepage from the tailings pond was beginning to impact the regional ground water in the immediate vicinity of the impoundment. It appeared that MW-2 was acting as a conduit for contaminated ground water from the perched zone getting to the regional water table." "

*Response: The HCI report is dated before the PTDF was taken out of service, before the abandonment of MW-2, and before the capping of the PTDF in 2006, and is, therefore, of limited utility for evaluating any data acquired since these mitigating efforts were carried out. Analytical data from monitoring wells in this area – MW-29-4, MW-29-5, MW-29-6, MW-29-7, MWE-29-8 – do not show evidence of exceedances of monitored constituents in the groundwater since 3Q 2005.*

Comment 5: "…we are still concerned today that the perched aquifer, clearly contaminated by the Piñon Tailing Impoundment, could impact the regional groundwater" and "GBRW views the contamination of the perched aquifer below the Piñon Tailings Impoundment as a violation of state law as seepage from the impoundment has degraded the Waters of the State" and "It would appear as though NDEP does not view the aquifer sampled in VW-1 as "Waters of the State." According to NRS 445A.415 the Waters of the State are defined:
"Waters of the State" means all waters situated wholly or partly within or bordering upon this State, including but not limited to:
1. All streams, lakes, ponds, impounding reservoirs, marshes, water courses, waterways, wells, springs, irrigation systems and drainage systems; and
2. All bodies or accumulations of water, surface and underground, natural or artificial.
GBRW requires that either NDEP take action on this degradation or explain why the state law is not being violated."

*Response: Referring to the fluids reporting to the vadose wells as a "perched aquifer" is incorrect. These are transitory flows which do not constitute an underground body of water, as evidenced by the consistent drying of the vadose wells observed since the PTDF was capped in 2006. Furthermore, it is correct that the Division does not consider these waters to be "Waters of the State" for enforcement purposes. Transitory water percolating through a vadose zone is not a practical source of drinking water and is, therefore, not considered by the Division to be "Waters of the State" for enforcement purposes. Analysis of samples taken from the monitoring wells which do access the local ground water have consistently shown no exceedances of the monitored constituents since 3Q 2005, confirming that the phenomenon observed in the vadose wells has not resulted in degradation of the waters in the historic aquifer which are "Waters of the State." This is acknowledged (for the constituents listed) in the comment letter where it is stated,* "As of the latest monitoring data (Fourth Quarter 2007) the "groundwater monitoring wells" do not show levels of WAD cyanide, chloride, sulfate, nitrate, or TDS above NDEP standards."

Comment 6: "…there is a disturbing trend in chloride, nitrate, and TDS for MW-3, Piñon Tailings Monitoring well, which shows increasing levels of all three of these constituents."

*Response: MW-3 does show upward trends for these three constituents over the last three years. However, the concentrations are all presently below the Profile I criteria and the chloride and TDS have leveled off in the last two reporting cycles. The Division will continue to monitor the results from this and other locations.*

Comment 7: "There are some reasons for concern about ultimate predictions for pit lake quality being relied on by NDEP in this permit. At a minimum, the details of the modeling as discussed herein should be better explained in the Pit Lake Study (and understood by the regulators). The permit should include regular monitoring of the forming pit lake in the North Mega Pit; this needs to be added to the draft permit" and "The NDEP should verify the model assumptions and require monitoring of the current pit lake."

*Response: The Division is satisfied with the details of the modeling as presented in the Pit Water Quality Update. The Permittee has agreed to add monitoring of the pit lake, if existent, to the permit. (See response to Comment 1 above.)*

Comment 8: "The model was run for just 100 years, so it clearly does not show the maximum value to be attained."

*Response: The model was run for 100 years which allows for >90% recovery of the pit lakes at which point inflow has reached a pseudo equilibrium. Simulation beyond 100 years is not considered to provide a reasonable amount of confidence in the accuracy of the predictions made therein.*

Comment 9: "The more recent waste should be tested with improved kinetic tests because of the significant proportion of acid-generating material in the pit and pit wall."

*Response: The present permit requires that all waste rock (including that used for pit backfill) be tested using the Meteoric Water Mobility Procedure (MWMP) and the Acid Neutralizing Potential/Acid Generating Potential (ANP/AGP) tests, which are recognized ASTM tests. This is an appropriate characterization of the material for the intended purpose.*

Comment 10: "The model does not account for dissolved oxygen in the lake or in the groundwater because it assumes that pit lake submergence will cause oxidation to cease. Although oxidation will be reduced, it will not be eliminated. The modeling should either account for this additional oxidation or provide evidence, including field groundwater observations, showing that dissolved oxygen in the groundwater is not utilized by sulfides in the bedrock. If this type of oxidation does occur, the model underestimates the concentrations of oxidation products in the inflow to the forming pit lake."

*Response: The assumption that oxidation of the pit wall materials following inundation is negligible compared with that occurring during the period when the pit walls are exposed to the atmosphere is based on several factors.*

*First, regarding dissolved oxygen in the pit lake, diffusion is the active transport mechanism for transfer of atmospheric oxygen to the reaction sites. The diffusion coefficient, which controls the rate of oxygen transport, for water is $2.6 \times 10^{-9}$ $m^2/s$ (Davis and Ritchie, 1986), whereas that for air is $2.25 \times 10^{-5}$ $m^2/s$ (Fennemore et al., 1998). Hence, transport rates of oxygen to reaction sites under similar gradients are reduced by approximately four orders of magnitude relative to oxidation rates for subaerial conditions. In fact, inhibited oxygen transport resulting from inundation is a common cause of the formation of anaerobic soil environments (Vartapetian and Jackson, 1997).*

*Second, regarding dissolved oxygen in the pit lake, the pit lake is terminal (having groundwater flow oriented toward the lake). Net molecular flux of oxygen to reaction sites is equal to the sum of the advective flux of groundwater and diffusive flux from the lake (e.g., Thorstenson and Pollock, 1989). In this case, the advective flux is oriented in opposition to the diffusive flux (i.e., into the lake). Thus any subaqueous diffusive flux from the lake would be further reduced, if not entirely offset by the advective flux.*

*Finally, based on our understanding of site groundwater chemistry, oxidation reactions in groundwater are believed to be negligible because:*

- *dissolved oxygen is generally not observed in bedrock groundwater,*

- *consistently high pH and alkalinity and low sulfate concentrations are observed in bedrock groundwater, and*

- *dissolved iron and manganese, which generally precipitate under circumneutral pH conditions in the presence of oxygen, are present in bedrock groundwater, indicating a lack of oxygen.*

*The apparent lack of influence of pyrite oxidation on bedrock groundwater quality indicates that any oxidation resulting from oxygen present in the bedrock groundwater is inconsequential relative to subaerial oxidation in the pit walls and floor. Furthermore, the solute loading associated with bedrock groundwater chemistry is accounted for in the model independent of the ultimate pit surface oxidation and solute loading. Hence, although not believed to be substantial, any utilization of dissolved oxygen in groundwater by sulfides in the bedrock is already accounted for in the bedrock groundwater chemistry.*

*In summary, the model is believed to appropriately represent solute loading from oxidation products. Oxidation rates in the oxidation rind of the pit are reduced by more than four orders of magnitude following inundation and are, therefore, considered to be negligible relative to oxidation rates in the subaerial domain. Additionally, any oxidation of sulfides in bedrock by groundwater is accounted for in the model by solute loading associated with groundwater inflows and those associated solute concentrations do not decrease following inundation.*

Comment 11: "…constituent concentrations have been highly erratic possibly because of the random nature of sampling locations."

*Response: See response to Comment 1 above. The additional permit monitoring requirements for pit lake water, if present, include the location for sampling.*

Comment 12: "The study blames the "lack of influx of high-alkalinity groundwater", as would occur during bona fide pit lake infilling, for the decreasing pH and alkalinity. This is a poor excuse because it implies the current inflow, which must just equal the evaporation rate from the proto-pond, does not contain sufficient alkalinity to offset the existing inflow of oxidation products. Based on the pit wall geochemistry, the inflow through the bottom 45 feet of the pit should be non-acid producing (see Figure 7 in the pit lake study)."

*Response: As noted in the response to Comment 10 above, high pH and alkalinity along with low sulfate concentrations have been consistently observed in bedrock water samples. Review of Figure 7 from the Pit Water Quality Update shows that the 'proto pit lake' is in an area of higher concentration of acid generating and potentially acid generating material than would be the case if the lake were deeper, spreading out to the south and west into areas of primarily non-acid generating material. For these reasons, the Division agrees with the statement in the analysis that the 'proto pit lake' represents a condition which puts a higher proportion of acid generating material in contact with the water body than will be the case when the pit lake has reached its full extent, resulting in lower pH and alkalinity for the 'proto pit lake' configuration.*

Comment 13: "The mixture of alkalinity with oxidation products in the inflow should currently be less favorable for the production of acid than when the pit lake has become more fully formed and inflow from the PAG rock is a large portion of the inflow. If the current inflow causes slightly-acid pH and a sulfate concentration exceeding 900 mg/l, the long-term water quality is suspect, as are the results of the pit lake modeling relied on here by NDEP."

*Response: See response to Comment 12 above.*

Comment 14: "Table 5 in the pit lake study shows that over the next several years, the proportion of acid producing rock to be added to the backfill increases while at the same time the amount of neutralizing rock to be added decreases. This is most prevalent between 2008 and 2011; during later years the amount of neutralizing rock increases. Considering the potential effects this backfill has on the pit lake water quality, it is surprising that NDEP would allow this backfill. As discussed above, it cannot be assumed that all of the oxidation will cease once the backfill becomes saturated because of the dissolved oxygen in the water."

*Response: See response to Comment 10 above. There is no supporting evidence to show that oxidation due to dissolved oxygen will be a significant contributor to acid generation in the pit backfill after saturation. The studies conducted of the samples taken of bedrock water do not support this conclusion but rather show no significant amounts of dissolved oxygen, mitigating the potential for this contribution to acid generation.*

Comment 15: "Another potential problem is that the model uses water quality data for water entering the pits from the translocated waste as being affected only by that waste. Because the waste is dry when it enters the pit, the inflow to it will be from the pit walls. The model should determine the water quality from the translocated waste as being a combination of inflow from the bedrock as modified by reactions with the waste."

*Response: Water quality emanating from translocated waste rock is determined by loading mass from the baseline bedrock into the waste material. Per Section 2.2.2 the amount of mass loaded is determined by integrating the chemical release function for the rock type (Appendix B) over the oxidized thickness (Figure 14). Because translocated waste rock has high porosity, waste rock has much greater oxidized thickness than the bedrock pit surface leading to increased mass loading from waste rock to the pit when compared to the same surface area exposure of bedrock in this conservative approach.*

References



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